Calcium & Bariatric Surgery

Introduction

Obesity is a common and costly health concern nationwide. The Centers for Disease Control and Prevention (CDC) estimates that over one third, a little over 78 million, of US adults are obese. Obesity is an established risk factor for many of the leading preventable causes of death, including heart disease, stroke, cancer and type 2 diabetes. Bariatric surgeries, including gastric banding and gastric bypass, are common treatment for significant weight loss among obese individuals.

Weight loss following bariatric surgery is often maintained long-term for the individual. In one systematic review researchers found that 47% of excess weight was lost and maintained after 15 years of follow up for laparoscopic adjustable gastric banding. While bariatric surgery is undeniably a useful tool for weight loss, and for improving obesity related morbidity and mortality, nutrient deficiencies, including fat-soluble vitamins and calcium, are also common side effects. This review will focus on calcium and bariatric surgery.

Nutrient Deficiencies

Nutrient deficiencies are not uncommon after bariatric surgery. For example, in duodenal switch or biliopancreatic diversion surgeries, decreased calorie absorption occurs as a result of intended fat malabsorption. This fat malabsorption leads to increased fat-soluble vitamin deficiencies, which can have negative clinical consequences on calcium levels. Additionally obese individuals may have preexisting nutrient deficiencies prior to surgery, and may have abnormal calcium balance due to unbalanced diet patterns. Bariatric surgery may lead to disturbances in calcium balance and bone mass, but may also worsen these preexisting nutrient deficiencies.

In one study after four years of follow up following duodenal switch or biliopancreatic diversion surgeries nearly 50% of people experienced hypocalcemia and secondary parathyroid abnormalities. Another study following 222 patients for one year after of gastric bypass surgery, researchers concluded that calcium and vitamin D supplementation were universally warranted at an individualized dose for optimal parathyroid function and maintenance of calcium and vitamin D levels.

Calcium and Body Weight

Interestingly, people with calcium deficiency, not necessarily associated with a surgical procedure, have been found to have higher BMIs and are more likely to gain weight. In one study researchers discovered that for every 300mg increase in calcium intake there was a decrease in body fat of 1kg for children, and 2.5-3kg for adults. The researchers further concluded that increasing calcium intake by approximately 2 dairy serving equivalents may reduce the risk of being overweight by as much as 70%.

The Metagenics Healthcare Institute for Clinical Nutrition
Adequate calcium intakes have also been associated with improved body fat levels. Lower calcium intake may lead to higher adiposity and plasma lipoprotein-lipid levels which are predictive for cardiometabolic disease. This data suggests that calcium supplementation may not only be useful for correcting a post surgical deficiency, but that adequate calcium levels may also play a significant role in weight management.

**Special Considerations for Female Following Bariatric Surgery**

Women with a history of bariatric surgery who are pregnant or post partum have an increased risk for calcium and other nutrient deficiencies. This is a result of the combination of metabolic and absorptive physiological changes following bariatric surgery, and the stressors and increased nutrient need of pregnancy. Researchers assessing the impact of supplementation with vitamin D, Calcium protein and physical exercise on bone metabolism following bariatric surgery found that combination supplementation with the mentioned nutrients, in combination with exercise, significantly decreased the bone mineral density loss in the female subjects.

**Conclusions**

Due to the compounding effects of vitamin and mineral deficiencies associated with bariatric surgery procedures, and calcium’s reported value for weight reduction and management, supplementation with calcium and vitamin D supplementation may be beneficial following bariatric surgical procedures. Patient compliance levels with supplementation are promising with one study finding that patients taking multivitamin, calcium/vitamin D and vitamin B-12 supplements was reported at 79-84% of patients at 1 year and 52-83% of patients 5 years after surgery. More research is warranted for dose and form of post bariatric surgery calcium supplementation.

**References**


